Effect of Toolkit Teaching Strategy on Pediatric Nursing Students' Practical Skills Regarding Neonatal Resuscitation

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Abstract

Background: Effective learner-centric innovative teaching strategies are currently being used to encourage active students' participation, enhance creative thinking and improve their problem-solving abilities. Toolkit strategy is one of these teaching strategies, which involves an integration of diversity teaching methods that improve undergraduate nursing students' learning capabilities and their confidence in the clinical setting. **Aim:** The aim of this study was to determine the effect of toolkit teaching strategy on pediatric nursing students' practical skills regarding neonatal resuscitation. **Setting:** The study was carried out in Pediatric Nursing Labs at the Faculty of Nursing, Damanhour University. **Subjects:** The subjects of the present study comprised of "70" students divided randomly into "study and control" groups 35 students per group. **Tools:** Two tools were used, namely, Neonatal Resuscitation Practical Skills Observational Checklist and Pediatric Nursing Students' Satisfaction Assessment Scale. **Results:** The study revealed a statistically significant difference between the study and control groups in relation to their practical skills in the performance of neonatal resuscitation procedure immediately after the conduction of teaching ($P<0.000^*$). Moreover, all students in the study group were highly satisfied after performing the procedure using toolkit strategy. Meanwhile, less than half of the students in the control group (42.9%) were highly satisfied with the traditional method of practical training and the difference was statistically significant ($P< 0.000^*$). **Conclusion:** It can be concluded that applying toolkit teaching strategy as a method of teaching has a positive effect on the practical skills of nursing students. Additionally, it improves their satisfaction level with the teaching process. **Recommendation:** The main recommendation of the current study was to apply toolkit teaching strategy as an innovative method of teaching in all academic nursing departments which possess practical skills in their academia courses at the Faculty of Nursing, Alexandria University and Damanhour University.

Keywords: Toolkit teaching strategy, Pediatric Nursing, Students' Practical Skills, Neonatal Resuscitation.

Introduction

Undergraduate nursing students are considering the cornerstone for next generation of future nursing profession. They have to be equipped with the prerequisites skills to improve their practical skills in clinical settings (Ahmed et al., 2018). In this frame, one of the important responsibilities of nursing education systems is preparing competent nurses. Where, they can provide patients with safe and high-quality care in the future (Fukada, 2018; Yilmaz et al., 2020).

Clinical setting is a place in which nursing students practice their technical skills with a real patient (Leal et al., 2018). In this respect, Abdallah et al. (2014) emphasized that practical skills acquisition and learning through dealing with patients can be very stressful for nursing students. They know that making mistakes can harm or even kill the patients so, the development of skill labs is mandatory. Skill-labs offer a protected training environment "mistake forgiving" that allows students to practice procedures on models prior to performing them on real patients. It minimizes the students' anxiety when they meet patients for the first time in clinical setting specifically in neonatal intensive care units (Mohammed et al., 2019).

Particular ingredients have been contributed to a successful learning experience in skills-lab

as: pre-defined learning goals, sustained practice, constructive feedback and the instructional approach as well. A variety of instructional approaches was used in the skills-lab to convey technical skills to students. The "see one, do one" method is the most predominant used one in which the skill is first demonstrated and elaborated by the teacher. Then, the students re-demonstrate the skill themselves under teacher's supervision (Ahmed et al., 2018). However, nursing education today's facing many challenges; one of these is the massive increase in the number of students in relation to the number of educators which imperatively leads to loss of students' skills acquisition. Moreover, students in higher education must participate in their learning that requires space for thinking and interaction with each others (Mohammed et al., 2019). In this context, toolkit teaching strategy is uniquely placed to contribute to meet this requirement (Ghasemi et al., 2020).

Recently, many researchers have suggested the integration of diversity educational methods (toolkit strategy). They found that using of an integrated educational methods as online activities and case studies significantly improved undergraduate nursing students' learning and their confidence in the clinical setting (Crookes et al., 2013; Ghasemi et al., 2020; Jie-hui xu, 2020). In addition, Murray (2016) and Waltz et al. (2014) acertained that the educational strategies that actively engaged nursing students in the learning process enhanced critical thinking, problem solving skills, and ultimately academic achievement of the students. Furthermore, the nursing students with different learning styles (auditory, tactile and visual) can benefit from using all their senses. In addition, the students can learn in a way that closely simulates real on the-job nursing situations that help in a competent transition into the workforce (Mangold et al., 2018).

It is extremely essential to select the appropriate educational strategies to make learning more appealing and effective. There are numerous educational strategies that faculty member can use to improve nursing students' learning regarding all nursing procedures such as: flipped classroom, concept/mind mapping, Peyton's four-step approach, and scenario-based simulation. These interactive teaching strategies can be incorporated in teaching neonatal resuscitation procedure which is considered one of the fundamental pediatric clinical skills and the most pivotal as a lifesaving procedure. (Jie-hui xu, 2020).

Flipped classroom: The conventional lectures or procedures are substituted by a strategy that integrates active learning activities and technology to enhance critical thinking skills. Students watch video in relation to what is going to be discussed next lecture before class or skill laboratory. Then, the valuable class time is allowed for active-learning activities as: discussions, individual or small group exercises, application activities and role playing (Busebaia & John 2020; Joseph et al., 2021).

Concept/ mind mapping: It is an alternative learning experience that facilitates organizing ideas, learning, building knowledge, solving problems, and critical thinking. It encourages nursing students to exhibit their contextual knowledge, creativity, and make associations between the central themes and branches that summarize the most basic subtopics. It stimulates the use of thinking skills such as analysis, brain storming, and evaluation as well as presenting a set of concepts placed in a thematic framework in a brief concise manner (Hamed & Shrief, 2015; Zadeh et al., 2015).

Peyton's Four-Step Approach: It comprises of four instructional steps; step 1 (demonstration) the teacher performs the skill at the usual pace and with no extra comments. Step 2 (deconstruction) the teacher repeats the skill, describing all sub-steps of the procedure in details. Step 3 (comprehension) the teacher performs the skill for third time, follows the student's instructions and explanation of the procedural sub-steps. Meanwhile, in step 4 (performance) the student performs the skill while explaining each sub-step on his own without help from the teacher. So, with frequent practice, students will be highly confident about their skills and will be able to perform satisfactorily in different situations (Muenster et al., 2016; Yap et al., 2016).

Scenario-based simulation: It is an artificial representation of a real-world event to

achieve educational goals through experiential learning. Scenarios are designed to assess, educate, and help learners to self-identify gaps in their understanding of material or application of knowledge. It can be used to address patient safety issues, clinical cases, teamwork opportunities, communication challenges, procedural competencies, and leadership skills (Kaneko & Lopes, 2019; Yilmaz et al., 2020).

Significance of the study

Despite the great role of toolkit strategy in enhancing students' skills acquisition, no studies integrate a diversity of innovative active teaching strategies and its effect on practical skills of undergraduate nursing students at the Faculty of Nursing, Alexandria University or Damanhour University. Moreover, pediatric nursing students must be competent to tackle real clinical situations efficiently and apply the training in real situations. Hence, it is crucial for the students to receive training in a safe place as skills lab before performing skills on real neonates (Ali et al., 2011). Furthermore, neonatal resuscitation procedure is anxiety provoking for students owing to its difficulty. Additionally, students thought that, training on neonatal resuscitation using traditional methods was not sufficient for them to be confident and competent in performing it. Therefore, reform in nursing education is needed to provide students with learning experiences to prepare them for professional practice. This necessitates the incorporation of an innovative clinical training approach such as toolkit teaching strategy for students to improve their performance in skills lab which in turn, could efficiently affect their practical skills and confident level in the clinical settings (Schröder et al., 2017).

Aim of the Study

The aim of the study was to determine the effect of toolkit teaching strategy on pediatric nursing students' practical skills regarding neonatal resuscitation. Further study objective was to explore students' satisfaction towards clinical teaching strategy after performing neonatal resuscitation.

Research Hypotheses

- Students who are taught through toolkit teaching strategy exhibit higher score in practical skills regarding neonatal resuscitation procedure than those who are taught through the traditional demonstration teaching method.
- Students who are taught through toolkit teaching strategy exhibit higher satisfaction level regarding the innovative teaching strategy than those who are taught through the traditional demonstration teaching method.

Operational Definition

Toolkit Teaching Strategy:

In the current study, it refers to integration of four different teaching strategies in skill lab namely; flipped classroom, concept/mind mapping, Peyton's four-step approach and scenario-based simulation.

Materials And Methods

Study design

A quasi-experimental research design was used to conduct this study.

Study setting

The study was conducted in Pediatric Nursing Labs (lab 1 and lab 2) at the Faculty of Nursing, Damanhour University. These labs contain equipment, supplies and pediatric manikins designed for students' clinical practices about different procedures as: neonatal resuscitation, colostomy care,…etc.

Study subjects

Sample size was estimated according to Epi-Info program using the following parameters:

- Population size =224.
- Expected frequency = 50%.
- Acceptable error =10%.
- Confidence coefficient =95%.
- Minimum sample size = 67 students.

A convenience sampling of 70 nursing students out of 224 students enrolled in the Pediatric Nursing Department, Faculty of

Nursing, Damanhour University, during the first semester of the academic year 2020-2021 were included in the current study. The sample was randomly assigned into two equal groups (35 students per group):

- **Study group:** who were taught through toolkit teaching strategy.
- **Control group:** who were taught through traditional demonstration teaching method as illustrated in **Figure 1**.

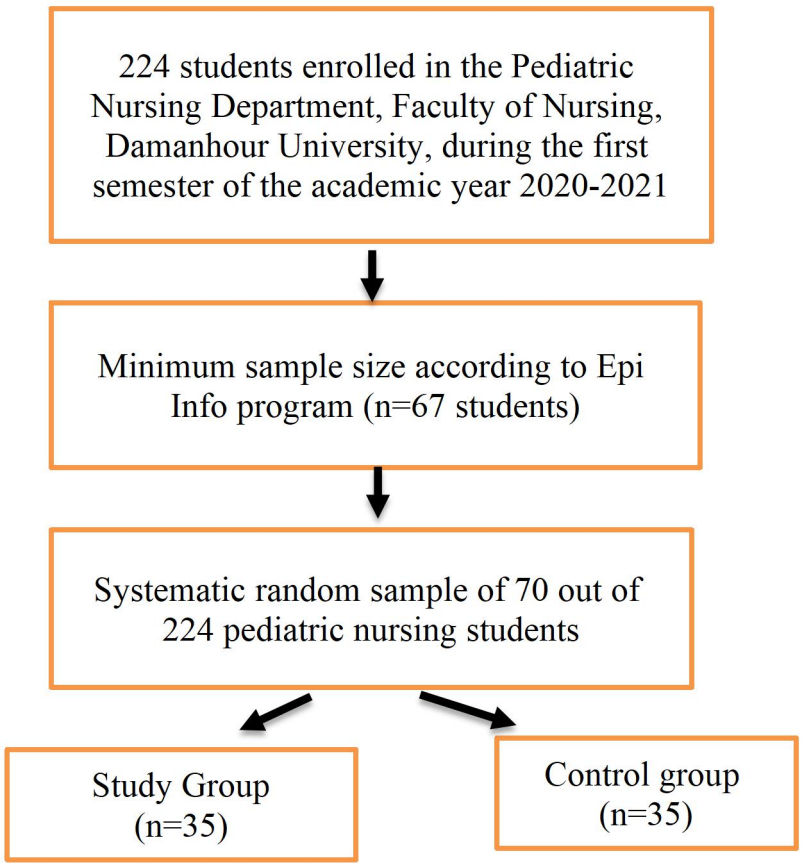

Figure 1: Flow chart of participants' recruitment process.

Study Tools

Two tools were used to collect necessary data

Tool One: Neonatal Resuscitation Practical Observational Checklist:

It was developed by the researchers guided by the Pediatric Nursing Procedures book that was developed by the Pediatric Nursing Staff of the Faculty of Nursing, Damanhour University (2020). The researchers adapted and adjusted the tool to five clinical scenarios to assess the pediatric nursing students' practical skills in performing neonatal resuscitation procedure. It includes 25 steps that are corresponding to five clinical scenarios related to initial steps of resuscitation for vigorous neonate, initial steps of resuscitation for non-vigorous neonate, positive pressure ventilation with adequate chest rising, positive pressure ventilation with no chest rising, as well as positive pressure ventilation and chest compression. Each item is graded as follows: "two for correct complete practical skill", "one for correct incomplete practical skill and "zero for not done or incorrect practical skill ". The total scores of

neonatal resuscitation practical skills ranged from (0-50 grades). The total scores represented as follows; unsatisfactory practical skills (<30) and satisfactory practical skills (30-50). These scores were converted into percentages and it was categorized as follows: Unsatisfactory level (<60%) and Satisfactory level (≥60%).

Additionally, a self- administered questionnaire sheet for pediatric nursing students' personal and academic characteristics as: age, gender, residence, and last certificate was attached to this tool.

Tool Two: Pediatric Nursing Students' Satisfaction Assessment Scale:

This scale was developed by the researchers after thorough review of related literature to assess satisfaction level for both the study and control groups after conduction of teaching and performing neonatal resuscitation procedure (Frangež, 2017; Liu & Xiao, 2021; Oliván Blázquez et al., 2019). It consists of 17 statements with a five-point Likert scale ranged from strongly disagree to strongly agree. As (strongly disagree =1, disagree=2, neutral=3, agree=4 and strongly agree=5). The total scores ranged from (17-85) and the higher score denotes a higher satisfaction level. It was calculated as follows; the cut off point for "High satisfaction" is ≥75% of the total scores (63.75-85), while "moderate satisfaction" is between 50% to less than 75% of the total scores (42.5-< 63.75) and "low satisfaction" less than 50% of the total scores (17-< 42.5).

Methods

- Approval from the Ethical Research Committee of the Faculty of Nursing at Damanhour University was obtained.
- An official permission to conduct the study was obtained from the responsible authority of the Faculty of Nursing, Damanhour University after explaining the aim of the study.
- Tool one was developed by the researchers guided by the Pediatric Nursing Procedures book of the Faculty of Nursing, Damanhour University (2020).
- Tool two was developed by the researchers after a thorough review of the relevant literature.
- Tools were tested for their content validity by five experts in Pediatric Nursing and Nursing Education fields.
- Reliability of the two tools was asserted using Cronbah's Alpha coefficient test. The coefficient values were (r = 0.75 for Tool one and 0.80 for Tool two) which are acceptable.
- A pilot study was conducted on 7 pediatric students who were selected randomly from the previously mentioned setting to evaluate the clarity and applicability of the research's tools. Accordingly, the necessary modifications were done. These students were excluded from the study subjects.
- The total sample size (70 students) was equally divided into two groups "study and control" 35 students for each group as follows:
- First, random selection by coins toss method revealed that Pediatric Nursing **lab 1** would be used for traditional learning method (control group) and Pediatric Nursing **lab 2** for toolkit strategy (study group).
- Then, each lab received a new group of students (16 students/group) every 2 weeks through the academic semester and all groups were divided on 7 rotations (one rotation / 2weeks).
- Every rotation, the researchers selected randomly 5 students from each **lab** to be included in the study from the students' attendance list using systematic random sample. The researchers selected each third student in the list to have 5 students (**lab 1** for the control group and **lab 2** for the study group).
- Initially, the pediatric nursing students' personal and academic characteristics were taken and recorded by the researchers for both groups through a self-administered questionnaire sheet that was distributed among students at the

beginning of the clinical day at the pediatric labs.

- **For control group at lab 1**, neonatal resuscitation procedure was demonstrated at the first day of rotation with traditional method of teaching clinical skills (two-step approach: see once and do once). Where, the clinical instructor performed the neonatal resuscitation procedure only one time (demonstration). Then, the students were allowed to perform it independently for one time (re-demonstration) under the clinical instructor's supervision.
- To evaluate the control group' practical skills (5 students /rotation), the researchers used neonatal resuscitation practical skills observational checklist **(Tool one)** immediately after performing the procedure and then two weeks later (during the time of rotation evaluation).
- **For study group at lab 2**, the application of the toolkit strategy was conducted in one day as follows :
- The videos concerning neonatal resuscitation were prepared and recorded by the researchers. Then, they were uploaded to the students' official platform (Microsoft Teams). These videos contained theoretical parts of neonatal resuscitation and algorithm of neonatal resuscitation with different clinical scenarios. Along with the videos, captions were included to enhance students' understanding.
- The researchers explained to the students via a recorded video how the flipped classroom works. They set expectations about the importance of pre-class preparation and emphasized that skill lab time would be used for group activities.
- Initially, the study group (5 students /rotation) were excluded from the routine clinical day only the first day of rotation and came at the time of open skill lab (2-6 PM) .
- The students in the study group were exposed to **a flipped classroom strategy** where they had to watch the educational videos at home the day before coming to the lab.
- During the clinical day, the toolkit teaching strategy training was implemented as described in following Agenda:

Time allowed	Activity& teaching method
2.00 pm- 2.15 pm	Orientation about each educational strategy.
2.15 pm- 2.45 pm	Discussion about the recorded videos concerning neonatal resuscitation as shown before (flipped the class).
2.45 pm- 3.35 pm	Concept/ mind mapping
3.35 pm- 5.15 pm	Application of Peyton's four-step approach
5.15 pm- 6.00 pm	Application of scenario- based simulation

Students' activities during the clinical day in the open skill lab:

- Start with orientation (**Time allowed fifteen-minutes**). The researchers briefly explained the different educational sterategies as: flipped classroom, concept/mind mapping, Peyton's four-step approach and scenario-based simulation. This helped students' understanding of the educational sterategies' objectives in relation to neonatal resustation procedure.i.e the students were informed about the nature of the study.
- **Activity I**: (**flipped the class - time allowed thirteen-minutes**) Students summarized in the form of discussion the main points about concepts they learned in the videos (e.g. mean of neonatal resuscitation, anticipation, etc.). The researchers clarified any confusion among students.

Activity II: Concept/ mind mapping:

- **Time allowed:** was about 25 minutes for writing (5 minutes/ Concept map) and 25 minutes for discussion with the researcher. (5 minutes / Concept map).

- The students were provided with markers and a five papers and were asked to write the following five concepts in the center and work outward from the central focus to create a five different concept/mind maps (one concept map in a paper): (1) neonatal resuscitation for vigorous neonate (2) neonatal resuscitation for non-vigorous neonate (3) positive pressure ventilation with adequate chest rising (4) positive pressure ventilation with no chest rising (5) positive pressure ventilation and chest compression.
- Then, the students presented information included in the five concept maps to the researchers (one concept map/ student).

- **Activity III. application of Peyton's four-step approach**
  - **Time allowed: the time** was around 100 minutes, 20 minutes for each student in the group for demonstrating and describing the procedures step by step in details for the different five clinical scenarios.
  - The researchers explained the neonatal resuscitation procedure using the **Peyton's four-step approach as follows:**
  - The students were trained to perform neonatal resuscitation procedure on a manikin using the Peyton's four-step approach with the following sequential steps; demonstration, deconstruction, comprehension, and performance/ practical skills according to the following sequence: During the first step, the researchers demonstrated the procedures (five clinical scenarios) silently "at normal speed, and without commentary"**(Demonstration**). Then, the researchers demonstrated the procedures while describing each step in details to the students (**Deconstruction)**. During the third step, the researchers demonstrated the procedures following each student's instruction for each step while all other students are observing (**Comprehension**). Finally, each student in the group demonstrated and described the procedures step by step in details concerning the five clinical scenarios followed by the researchers' feedback (**Performance/ practical skills)** (Muenster et al., 2016).

Activity IV. Scenario-based Simulation:

- **Time allowed:** was 45 minutes for all students' five scenes of the clinical scenarios. For each scene of the clinical scenario, the time was allocated as follows: almost two minutes for briefing session, around three minutes for action phase and four minutes for debriefing session.
- The neonatal resuscitation clinical scenario was built and divided into five scenes relevant to the videos material they had watched; initial steps of resuscitation for vigorous neonate, initial steps of resuscitation for non- vigorous neonate, positive pressure ventilation with adequate chest rising, positive pressure ventilation with no chest rising and positive pressure ventilation and chest compression.
- The simulated environment, the needed equipment, devices and medium fidelity mannequin were prepared in the skill lab.
- Each scene of the clinical scenario was implemented through briefing, action, and debriefing. During the briefing session, researchers gave the scripts to the students and clarified their role within two minutes and asked them to manage the neonate's problem accordingly.
- In the action phase, every student played the assigned role in scene of the resuscitation clinical scenario on a medium-fidelity mannequin within three minutes.
- Each action phase of each scene of clinical scenario was recorded as a video by a researcher. The other researchers took notes about the students' practical skills to be discussed in debriefing session.
- At the end of each scene, the researchers conducted an immediate four minutes debriefing session. During this session, the students were allowed to observe their

practical skills from the recorded video. Then, they were allowed to discuss and reflect on their practical skills in a non-judgmental way. The researchers gave them constructive feedback, clarified doubts, and summarized the key points (Jeffries et al., 2015).

- The scripts of scenes were given to students alternatively and the roles were clarified to ensure that each student played a different role in each scene of the five clinical scenarios.
- To evaluate the study group's practical skills (5 students /rotation), the researchers used neonatal resuscitation practical skills observational checklist **(Tool One)** immediately after performing the procedure (during scenario- based simulation) then two weeks later (during the time of final rotation evaluation).
- The satisfaction level was measured for all the pediatric nursing students in both the study and control groups in the first day of rotation immediately after the conduction of teaching and performing the procedure using (**Tool Two)**.

Data collection :

The data were collected over a period of three months during the clinical rotation of first semester of the academic year 2020-2021.

Ethical considerations:

- Written informed consent was obtained from all the pediatric nursing students after providing an appropriate explanation about the aim of the study.
- Students have the right to withdraw at any time.
- Confidentiality of students' data and anonymity were assured.
- Students in the study group approved the video recording of their scenario -based simulation sessions.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 23 was utilized for data analysis. Descriptive statistics included number, percentage, mean and standard deviation to describe the students' characteristics. Kolmogorov-Smirnov test was used to check the normality of study variables, and it showed that they were not normally distributed. In Analytical statistics, the Chi-square test was used to compare the differences and test the significance between students' characteristics, practical skills and the total percent score of satisfaction levels immediately after the conduction of teaching. In addition, Fisher's Exact test was used to compare the differences and test the significance between students' practical skills two weeks later after the conduction of teaching. Moreover, the Chi-square and Fisher's Exact tests were used to compare the differences and test the significance between students' satisfaction levels immediately after the conduction of teaching. All of the statistical analyses were considered significant at $P \leq 0.05$.

Results

Table 1: illustrates the distribution of pediatric nursing students in the study and control groups according to their personal and academic characteristics. It was noticed that there was an equal distribution of the students in both the study and control groups concerning their age. The vast majority of the students (91.4 %) in both groups were more than 20 years old. Moreover, 57.1% of the students in both groups were females. Similar percentage in both groups from rural areas (57.1%).

In relation to the students' last certificates; it was found that the majority of students in the study and the control groups were graduated from general secondary school (80.0 % and 82.9 % respectively). No statistical significant differences were detected between the study and control groups in relation to all personal and academic characteristics. This means that both groups are matched.

The distribution of pediatric nursing students in the study and control groups according to their practical skills level in the performance of the neonatal resuscitation procedure immediately and two weeks after the conduction of teaching is clarified in

Regarding to the practical skills level immediately after the conduction of teaching, it can be seen from the **table 2 and figure 2** that

the minority of the students in the study group (17.1%) compared to approximately two thirds (65.7%) of those in the control group had unsatisfactory practical skills level. Meanwhile, the majority of students in the study group (82.9%) compared to 34.3% of those in the control group had satisfactory practical skills level. There was a significant statistical difference between the study and control groups concerning their practical skills level immediately after the conduction of teaching using toolkit strategy for the study group and traditional method for the control group (P< 0.000*).

The **table 2 and figure 2** also reflected the distribution of pediatric nursing students in the study and control groups according to their practical skills level in the performance of the neonatal resuscitation procedure two weeks after the conduction of teaching. It was found that the highest percentage of the students in the study group (97.1%) and 82.9% of those in the control group had satisfactory practical skills level. Also, the lowest percentage of the students in the study (2.9%) compared to 17.1% of the students in the control group had unsatisfactory practical skills level. However, the difference was not statistically significant where P = 0.106.

Table 3 shows the distribution of pediatric nursing students in the study and control groups according to their satisfaction level immediately after the conduction of teaching. Regarding to the value of the teaching method, 57.1% of the students in the study group and only 17.1% of those in the control group were strongly agreed in that the teaching strategy prepared them to care in real situation. In addition, 94.3% and 71.4% of the students in the study and control groups respectively were strongly agreed in that the teaching strategy made them feel confident in performing the procedure independently. Furthermore, 82.9% of the students in the study group compared to none of those in the control group were strongly agreed in that the method of teaching helped them in developing their clinical decision making ability.

All students in the study group compared to none of those in the control group were strongly agreed in that the method of teaching promoted the interaction between them and their instructor and their colleagues, provided them with a variety of teaching methods and motivated and helped them to learn. Also, all students in the study group compared to 28.6% of those in the control group were strongly agreed in that the teaching strategy provided an opportunity for learning through involvement. Moreover, 91.4% students in the study group compared to only 5.7% of those in the control group were strongly agreed in that the repeated observations of the procedure facilitates the remembering of procedural steps. All students in the study group and 20.0% of those in the control group were strongly agreed in that the method of teaching grasps their attention. Also, 60.0% of the students in the study group and 14.3% of those in the control group were strongly agreed in that the method of teaching decreased their anxiety during the procedure. All students in the study group and 62.9% of those in the control group were strongly agreed in that the method of teaching helped them in learning from the comments made by their facilitator before, during or after the clinical training session. There were significant statistical differences between the study and control group in relation to value of teaching method (P< 0.000* for each).

Regarding to feedback and reflection, 74.3 % of the students in the study group compared to none of those in the control group were strongly agreed in that the method of teaching provided them with an opportunity to reflect on and discuss their performance and ask questions during the clinical training session and the difference was statistically significant where, P< 0.000*.

Table 4 & figure 3: Reflect the distribution of pediatric nursing students in the study and control groups according to their total percent scores of satisfaction level immediately after the conduction of teaching. It was observed that all students in the study group were highly satisfied after performing neonatal resuscitation procedure using toolkit strategies. Meanwhile, less than half of those in the control group (42.9%) were highly satisfied with the traditional method of training. However, there was a significant statistical difference between the two groups regarding their satisfaction levels after performing neonatal resuscitation procedure (P<0.000).

Table 1: Distribution of Pediatric Nursing Students in the Study and Control Groups According to their Personal and Academic Characteristics

Personal and Academic Characteristics	Study Group (n=35)		Control Group (n=35)		Test of significance & P value
	No.	%	No.	%	
Age (years)					
≤ 20	3	8.6	3	8.6	-NA-
> 20	32	91.4	32	91.4	
$\overline{X}$ ± SD	20.3 ± 0.8		20.2 ± 0.9		-NA-
Gender					
Male	15	42.9	15	42.9	-NA-
Female	20	57.1	20	57.1	
Residence					
Urban	15	42.9	15	42.9	-NA-
Rural	20	57.1	20	57.1	
Last certificate					
General Secondary School	28	80.0	29	82.9	X^2 =0.094
Associate degree of Nursing	7	20.0	6	17.1	P= 0.759

X^2: Chi Square test P: P value of Chi Square test * Significant at P ≤ 0.05

Table 2: Distribution of Pediatric Nursing Students in the Study and Control Groups According to their Practical Skills Level in the Performance of Neonatal Resuscitation Procedure Immediately and Two Weeks after the Conduction of Teaching

Levels of Practical Skills	Immediately after the conduction of teaching							Two weeks after the conduction of teaching						
	Study Group (n= 35)		Control Group (n=35)		Total		Test of Significance	Study Group (n= 35)		Control Group (n= 35)		Total		Test of Significance
	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%	
Unsatisfactory	6	17.1	23	65.7	29	41.4	X^2 =17.014	1	2.9	6	17.1	7	10.0	FET =0.254
Satisfactory	29	82.9	12	34.3	41	58.6	P<0.001*	34	97.1	29	82.9	63	90.0	P= 0.106

X^2: Chi Square test FET: Fisher's Exact Test
P: P value of Chi Square/ Fisher's Exact test * Significant at P ≤ 0.05

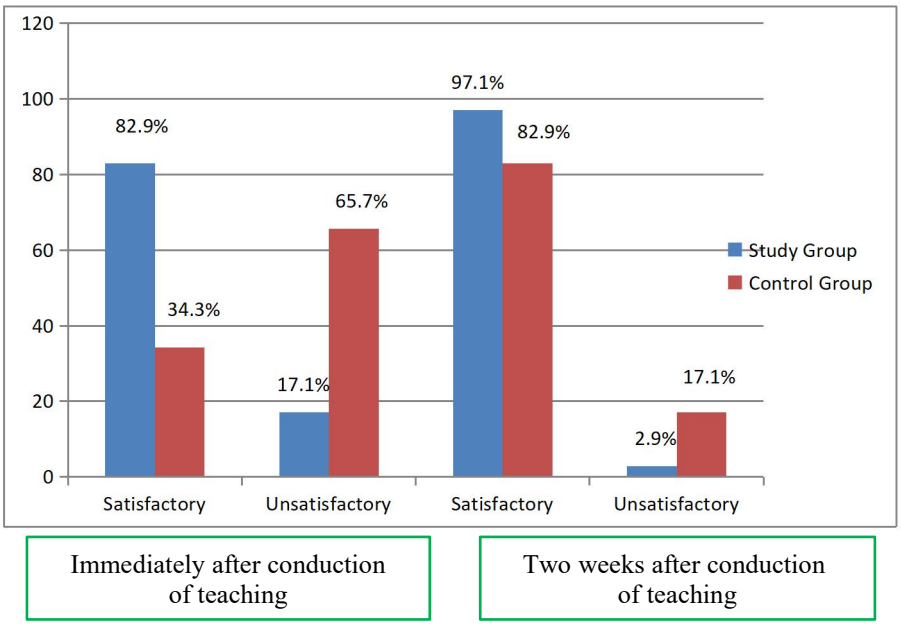

Figure 2: Distribution of Pediatric Nursing Students in the Study and Control Groups According to their Practical Skills Level in the Performance of Neonatal Resuscitation Procedure Immediately and Two Weeks after the Conduction of Teaching

Table 3: Distribution of Pediatric Nursing Students in the Study and Control Groups According to their Satisfaction Level Immediately after the Conduction of Teaching

Items of satisfaction	Study Group (n=35) Levels of satisfaction						Control Group (n=35) Levels of satisfaction						Test of Significance
	Strongly agree		Agree		Disagree		Strongly agree		Agree		Disagree		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Value of teaching method													
Prepared me to care in real situation.	20	57.1	15	42.9	0	0.0	6	17.1	20	57.1	9	25.8	FET = 18.172 P< 0.000*
Felt confident in performing the procedure independently.	33	94.3	2	5.7	0	0.0	25	71.4	10	28.6	0	0.0	X^2 =6.437 P< 0.000*
Developed my clinical decision making ability.	29	82.9	6	17.1	0	0.0	0	0.0	35	100	0	0.0	X^2 =49.512 P < 0.000*
Promoted the interaction between me and my instructor and my colleagues.	35	100	0	0.0	0	0.0	0	0.0	24	68.6	11	31.4	X^2 =70.000 P < 0.000*
Provided me with a variety of teaching methods .	35	100	0	0.0	0	0.0	0	0.0	0	0.0	35	100	X^2 =70.000 P < 0.000*
Motivated and helped me to learn.	35	100	0	0.0	0	0.0	0	0.0	0	0.0	35	100	X^2 =70.000 P < 0.000*
Provided an opportunity for learning through involvement.	35	100	0	0.0	0	0.0	10	28.6	25	71.4	0	0.0	X^2 =38.889 P < 0.000*
The repeated observations of the procedure facilitated the remembering of procedural steps.	32	91.4	3	8.6	0	0.0	2	5.7	7	20.0	26	74.3	X^2 =54.071 P <0.000*
This method grasped my attention.	35	100	0	0.0	0	0.0	7	20.0	20	57.1	8	22.9	FET = 52.645 P<0.000*
Decreased my anxiety during the procedure.	21	60.0	11	31.4	3	8.6	5	14.3	20	57.1	10	28.6	X^2 =16.228 P <0.000*
I learned from the comments made by my facilitator before, during or after the clinical training session.	35	100	0	0.0	0	0.0	22	62.9	13	37.1	0	0.0	X^2 =15.965 P <0.000*
Feedback and reflection													
I had the opportunity to reflect on and discuss my performance and ask questions during the clinical training session.	26	74.3	9	25.7	0	0.0	0	0.0	15	42.9	20	57.1	X^2 =47.500 P < 0.000*
Feedbacks were constructive, enhanced my learning and helped me to develop my clinical reasoning skills.	35	100	0	0.0	0	0.0	35	100	0	0.0	0	0.0	----------

X^2: Chi Square test FET: Fisher's Exact Test

P: P value of Chi Square/ Fisher's Exact test * Significant at P ≤ 0.05

N.B: No student chose either neutral or strongly disagrees

Table 4: Distribution of Pediatric Nursing Students in the Study and Control Groups According to their Total Percent Scores of Satisfaction Level Immediately after the Conduction of Teaching

Satisfaction level		Groups		Total	Significance
		Study Group (n=35)	Control Group (n=35)		
High	**No.**	35	15	50	X^2 = 28.000 P < 0.000*
	%	100	42.9	71.4	
Moderate	**No.**	0	20	20	
	%	0.0	57.1	28.6	
Total	**No.**	35	35	70	
	%	100	100	100	

X^2: Chi Square test P: P value of Chi Square * Significant at P ≤ 0.05

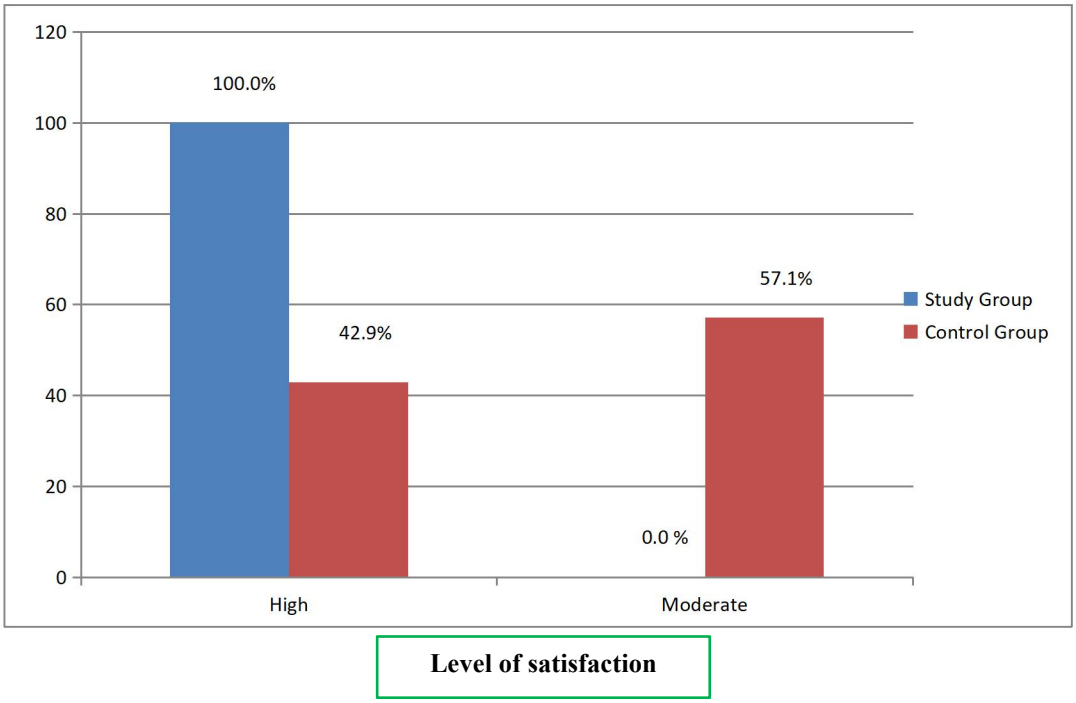

Figure 3: Distribution of Pediatric Nursing Students in the Study and Control Groups According to their Total Percent Scores of Satisfaction Level Immediately after the Conduction of Teaching

Discussion

It is well known that, the fundamental goal of teaching process for all fields of nursing education is to improve students' learning outcomes and increase their level of academic achievement. Therefore, raising the quality of teaching especially for practical skills is hugely important to ensure that prerequisites for practical skills are secure, and models of excellent performance as well as academic guidance are accessible (Coe et al., 2020; Giacomino et al., 2020).

Currently, due to Covid-19 crisis the educational organizations are in turmoil. Traditional methods of teaching especially at practical educational College are not appropriate for this era. Consequently, pediatric nursing faculty staff must learn quickly to adapt, teach remotely through online platforms and use new teaching strategies to enhance their students' learning outcomes especially clinical competencies (Raghunath et al., 2020). Where, neonatal resuscitation as a lifesaving procedure has to be performed properly and skillfully. So, the aim of this study was to determine the effect of toolkit teaching strategy

on pediatric nursing students' practical skills regarding neonatal resuscitation. Further study objective was to explore students' satisfaction towards clinical teaching strategy after performing neonatal resuscitation.

Immediately after conduction of teaching using the toolkit strategy for the study group, and traditional method for the control group, it was clear from the current study that the majority of students in the study group compared to around one third of those in the control group had satisfactory level regarding practical skills in the performance of the procedure with a significant statistical difference between them. This difference could be related to intense using of innovative teaching strategies which made practical training more effective. As scenario-based simulation offered an interactive approach which supports students' active learning. Moreover, flipped class enabled instructors to spend the most of the clinical time in active learning activities with students and facilitate them toward creation of higher level of application which culminate in increased active learning. Also, using of concept mapping enriched meaningful learning among students, represented the knowledge, stimulated the generation of ideas, and improved students' own creativity. Furthermore, applying Peyton's four-step approach was effective and enhanced trainee skills retention over time with repeated practice. The finding of Xu (2016) was in line with the current study finding, who concluded that integrated teaching strategies can engage nursing students in active learning and help them to memorize the information associated with lessons. In this context, Ghasemi et al. (2020) emphasized that collection of a variety of teaching strategies promotes nursing students' engagement, which is one of the important determinants of students' success.

The present study revealed that the highest percentage of the students in both the study and the control groups had satisfactory level of practical skills two weeks after the conduction of teaching. This result could be interpreted in the light of that it was the time for final evaluation of the rotation and all the students did their best to catch high evaluation either by focus studying on the specific lab contents or training in open skill lab especially for difficult procedures as neonatal resuscitation. Despite, the improvement in the practical skills level of both groups, the study group practical skills level was higher than the control group. This could be due to the retained information and learned skills through using many innovative teaching strategies. This finding comes in line with Awad & Mohamed (2019) who found that using of Peyton's four-step approach as a model for teaching practical skills was helpful for the students and improved their practical skills level. The same result was reported by Raghunath et al. (2020) who revealed that Peyton's four-step approach was a feasible and acceptable method that can be used effectively to improve performance and recall memory of a clinical skill. In contrast, Münster et al. (2016) showed that there were no essential differences in external chest compression during neonatal resuscitation performed by medical students dependent on the teaching method Peyton versus non-Peyton.

The study also revealed that incorporating a motivational method of teaching as scenario-based simulation was effective in improving practical skills of students. In the same line, Bonney (2015) and Rehna & Abraham (2019) reported that case study scenario based teaching method improved students' performance. Further studies pointed that the application of scenario based teaching method in clinical teaching can effectively enhance understanding of theoretical knowledge, improve the proficiency of skills, upgrade communication skills as well as the critical thinking ability (Frangež, 2017; Jiang et al., 2020; Liu & Xiao, 2021).

Another used innovative teaching strategy that has a vital effect on students' practical skills is flipped class. As mentioned by (Bachiller & Badía, 2020) who declared that flipped class improved the students' performance and made learning more sustainable. The same finding was reported by Motameni (2018). The finding of the present study also goes in congruence with the finding of Oliván Blázquez et al. (2019) who reported that the flipped class as teaching method was more effective than traditional method regarding optimize academic performance. Similarly, Hew & Lo (2018) published a meta-

analysis which revealed that the current evidence suggests that the flipped classroom approach in health professional education yields a significant improvement in students' learning compared with traditional teaching methods. Additionally, concept mapping also had a proactive role in improving students' learning. Hamed & Shrief (2015) found that there were significant improvements in the students' simulation case study rubric, problem solving skills and students' attitude after application of concept mapping in the clinical settings.

The success of innovative teaching strategies is reflected on so many domains, one of the important domains of evaluation for the success of the teaching method is students' satisfaction level (Mills et al., 2014). As regards the total percent score of satisfaction level after performing neonatal resuscitation procedure. It was observed from the present study that all students in the study group were highly satisfied after performing neonatal resuscitation procedure using toolkit strategy. Meanwhile, less than half of those in the control group were highly satisfied with the traditional method of training, and the difference regarding their satisfaction levels between the two groups was statistically significant. This finding may be due to many reasons. First of all integrating diversity of innovative active teaching strategies encourages students' involvement. The second reason could be due to the use of flipped class which allowed extra time within the lab for students' participation and application. Lastly, every student feels that he has a role in learning process especially during the step 3 of Peyton's four-step approach. In this respect, Krautter et al. (2015) assumed that Peyton's step 3 (comprehension) represents the crucial instructional substep in Peyton's four-step approach and hence leads to a superior performance of clinical skills as compared to standard instruction.

It is obvious that exposure to positive clinical learning experience influences the nursing students' performance and increase their satisfaction as well (Abouelfettoh & Al-Mumtin, 2015; Tan et al., 2017). As regards the value of teaching method, the present study revealed that all students in the study group were strongly agreed in that toolkit teaching strategy grasped their attention, motivated and helped them to learn, provided an opportunity for learning through involvement and promoted the interaction between them, the instructor and their colleagues as well as learned from comments made by the clinical instructors. While, the majority of the students were strongly agreed in that the repeated observations of the procedure facilitated the remembering of procedural steps, made them feel confident in performing the procedure independently and developed their clinical decision making ability. In addition, more than half of the student reported that toolkit strategy prepared them to care for real situation and decreased their anxiety during the procedure.

Also, the present findings may be due to efficiency of toolkit training and using different educational methods simultaneously which enhance active learning. This in turn made the students more interactive, collaborative and involved with the procedure. Furthermore, learning through repetition required constant concentration. These results were in agreement with the results of Angadi et al. (2019), Kehoe et al. (2018), Nouri (2016) and Sebaee et al. (2017) who found that flipped classroom improved students' satisfaction, self-learning, increased their motivation and engagement. Ahmed et al. (2018) revealed that Peyton's four-step approach was an effective clinical teaching approach that contributes in improving the critical care nursing students' self- confidence and satisfaction in performing neonatal resuscitation procedure. Moreover, as reported by many authors concept mapping teaching method used in nursing education had a variety of positive effects, such as, upgrade the students' critical thinking skills, improve nursing competence skills, students' satisfaction and cognitive learning levels (Dorttepe & Arikan, 2019; Kassab, 2016; Romero et al., 2017). Also, Hung et al. (2021) concluded that scenario-based simulation is effective in improving nursing students' perceived competence, self-efficacy, and learning satisfaction. They stated that multiple instructional strategies beside simulation are recommended to maintain nursing students' learning interests to achieve optimal learning outcomes of the course.

Considering the growing demand for nursing professionals, where undergraduate nursing students have a crucial role in building the future of nursing profession. The pediatric faculty staff should use the innovative learning strategies such as toolkit strategy to equip these students with needed skills and qualifications to improve their performance in skills lab. This in turn, could efficiently affect their performance in the different clinical settings.

Conclusion

It was obvious from the present study that applying a toolkit strategy as an innovative clinical teaching strategy has a positive effect on the practical skills of the pediatric nursing students immediately after conduction of teaching. As, they exhibit higher competency practical skills in performing neonatal resuscitation procedure than students who taught through traditional teaching method. Furthermore, learning through combination of new educational strategies as flipped classroom, concept/mind mapping, and scenario-based simulation in addition to active participation and engagement through Peyton's four-step approach improved the students' satisfaction level regarding the innovative teaching method in performing neonatal resuscitation procedure.

Recommendations

Based on the current study, the following recommendations are suggested

1- Develop workshops or training programs to all nurse educators at Faculty of Nursing, Alexandria and Damanhour Universities about toolkit teaching strategy to help them apply this approach effectively.

2- Toolkit teaching strategy should be applied in all academic nursing departments which possess practical skills in their academia courses at the Faculty of Nursing, Alexandria and Damanhour Universities.

3- Replicate the study on a larger number of students for generalization.

4- Include toolkit teaching strategy as innovative method of teaching in the curricula of undergraduate program.

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Conflict of Interest

The authors have declared no conflict of interest

References

Abdallah, B., Irani, J., Sailian, S. D., Gebran, V. G., & Rizk, U. (2014). Nursing faculty teaching a module in clinical skills to medical students: A Lebanese experience. *Advances in Medical Education and Practice*, *5*, 427-32.

Abouelfettoh, A., & Al Mumtin, S. (2015). Nursing students' satisfaction with their clinical placement. *Journal of Scientific Research and Reports*, 4(6)490-500. doi: 10.9734/JSRR/2015/12046

Ahmed, F. R., Morsi, S. R., & Mostafa, H. M. (2018). Effect of Payton's four step approach on skill acquisition, self-confidence and self-satisfaction among critical care nursing students. *IOSR Journal of Nursing and Health Science (IOSR-JNHS),*7(6),38-47.

Ali, L., Nisar, S., Ghassan, A., & Khan, S. A. (2011). Impact of clinical skill lab on students' learning in preclinical years. *Journal of Ayub Medical College Abbottabad*, 23(4), 114-7.

Angadi, N. B., Kavi, A., Shetty, K., & Hashilkar, N. K. (2019). Effectiveness of flipped classroom as a teaching–learning method among undergraduate medical students–An interventional study. *Journal of Education and Health Promotion*, 8, 211. doi: 10.4103/jehp.jehp_163_19

Awad, S. A., & Mohamed, M. H. (2019). Effectiveness of Peyton's four-step approach on nursing students' performance in skill-lab training. *J Nurs Educ Practice,* 9 (5). doi: 10.5430/jnep.v9n5p1

Bachiller, P., & Badía, G. (2020). The flip teaching as tool to improving students' sustainable learning performance in a

financial course. *Sustainability*, 12(23),2-11. doi:10.3390/su12239998

Bonney, K. M. (2015). Case study teaching method improves student performance and perceptions of learning gains. *Journal of Microbiology & Biology Education*, 16(1), 21–8. doi: 10.1128/jmbe.v16i1.846

Busebaia, T. J. A., & John, B. (2020). Can flipped classroom enhance class engagement and academic performance among undergraduate pediatric nursing students?. A mixed-methods study. *Research and Practice in Technology Enhanced Learning*, 15(1), 1-16.

Coe, R., Rauch, C. J., Kime, S., & Singleton, D. (2020). Great teaching toolkit: evidence review. https://www.cambridgeinternational.org/Images/584543-great-teaching-toolkit-evidence-review.pdf.

Crookes, K., Crookes, P. A., & Walsh, K. (2013). Meaningful and engaging teaching techniques forr student nurses: A literature review. *Nurse Education in Practice*, 13(4), 239-43.

Dorttepe, Z. U., & Arikan, B. (2019). Use of concept maps in nursing education/Hemsirelik Egitiminde Kavram Haritalari Kullanimi. *Journal of Education and Research in Nursing*, 16(2), 160-6.

Frangež, M. (2017). Medical students perform basic life support skills in a simulated scenario better using a 4-stage teaching approach compared to conventional training. Signa vitae. *Journal for Intensive Care and Emergency Medicine,* 13(1), 61-4.

Fukada, M. (2018). Nursing competency: definition, structure and development. *Yonago Acta Media Research*,61(1), 001-007.

Ghasemi, M. R., Moonaghi, H. K., & Heydari, A. (2020). Strategies for sustaining and enhancing nursing students' engagement in academic and clinical settings: A narrative review. *Korean Journal of Medical Education*, 32(2),103-17.

Giacomino, K., Caliesch, R., & Sattelmayer, K. M. (2020). The effectiveness of the Peyton's 4-step teaching approach on skill acquisition of procedures in health professions education: A systematic review and meta-analysis with integrated meta-regression. *Peer Journal*, 8, e10129.doi: 10.7717/peerj.10129

Hamed, L. A., & Shrief, S. E. (2015). Concept mapping to improve nursing students' performance in clinical area. *Al-Azhar Assiut Medical Journal*, 13(4), 276-88.

Hew, K. F., & Lo, C. K. (2018). Flipped classroom improves student learning in health professions education: A meta-analysis. *BMC Medical Education*, 18(1), 1-12.

Hung, C. C., Kao, H. F. S., Liu, H. C., Liang, H. F., Chu, T. P., & Lee, B. O. (2021). Effects of simulation-based learning on nursing students' perceived competence, self-efficacy, and learning satisfaction: A repeat measurement method. *Nurse Education Today*, 97(1), 104725.doi:10.1016/j.nedt.2020.104725

Jeffries, P. R., Rodgers, B., & Adamson, K. (2015). NLN Jeffries simulation theory: brief Narrative Description. *Nursing Education Perspectives*, 36(5), 292–3. https://doi.org/10.5480/1536-5026-36.5.292.

Jiang, Y., Shi, L., Cao, J., Zhu, L., Sha, Y., Li, T., ... & Wei, J. (2020). Effectiveness of clinical scenario dramas to teach doctor-patient relationship and communication skills. *BMC Medical Education,* 20(1), 1-8.

Jie-hui xu. (2020). Toolbox of teaching strategies in nurse education. *Journal of Chinese Nursing Research*, *3*,54-7.

Joseph, M. A., Roach, E. J., Natarajan, J., Karkada, S., & Cayaban, A. R. R. (2021). Flipped classroom improves Omani nursing students performance and satisfaction in anatomy and physiology. *BMC nursing*, 20(1), 1-10.

Kaneko, R. M. U., & Lopes, M. H. B. D. M. (2019). Realistic health care simulation scenario: what is relevant for its

design?. *Revista da Escola de Enfermagem da USP*, 53. https://doi.org/10.1590/S1980-220X2018015703453.

Kassab, S. E. (2016). Concept mapping as a tool for learning and assessment in problem-based learning. *Suez Canal University Medical Journal*, 19(1), 1-9.

Kehoe, T., Schofield, P., Branigan, E., & Wilmore, M. (2018). The double flip: applying a flipped learning approach to teach the teacher and improve student satisfaction. *Journal of University Teaching & Learning Practice*, 15(1), 1-17.

Krautter, M., Dittrich, R., Safi, A., Krautter, J., Maatouk, I., Moeltner, A., & Nikendei, C. (2015). Peyton's four-step approach: differential effects of single instructional steps on procedural and memory performance-a clarification study. *Adv Med Educ Prac,* 6, 399–406.

Leal, L. A., Soares, M. I., Silva, B. R. D., Bernardes, A., & Camelo, S. H. H. (2018). Clinical and management skills for hospital nurses: perspective of nursing university students. *Revista Brasileira de Enfermagem*, 71, 1514-21.

Liu, B., & Xiao, C. (2021). Application analysis of scenario simulation teaching method combined with progressive teaching mode in clinical teaching of orthopaedic nursing. *The International Journal of Electrical Engineering & Educatio.* https://doi.org/10.1177/002072092110032 65

Mangold, K. L., Kunze, K. L., Quinonez, M. M., Taylor, L. M., & Tenison, A. J. (2018). Learning style preferences of practicing nurses. *Journal for Nurses in Professional Development*, 34(4), 212-8.

Mills, J., Dalleywater, W., Tischler, V. (2014). An assessment of student satisfaction with peer teaching of clinical communication skills. *BMC Medical Education*,14, 217. doi: 10.1186/1472-6920-14-217.

Mohammed, A.A.A., Mohammed, N. Y., Ouda, M. M.A., & Abu ElEla, L. A. (2019). Effect of peers' application of modified Peyton's four-step approach versus traditional learning on pediatric Nursing students' performance. *Journal of Health, Medicine and Nursing*, 69, 65-77.

Motameni, R. (2018). The combined impact of the flipped classroom, collaborative learning, on students' learning of key marketing concepts. *Journal of University Teaching & Learning Practice,* 15(3), 1-18.

Muenster, T., Stosch, C., Hindrichs, N., Franklin, J., & Matthes, J. (2016). Peyton's 4-Steps-Approach in comparison: medium-term effects on learning external chest compression–a pilot study. *GMS Journal for Medical Education*, 33(4)1-11. ISSN 2366-5017. doi: 10.3205/zma001059.

Murray, T. A. (2016). Pedagogy and academic success in prelicensure nursing education. *Journal of Professional Nursing*, 32(5), S24-S9.

Nouri, J. (2016). The flipped classroom: for active, effective and increased learning–especially for low achievers. *International Journal of Educational Technology in Higher Education*, 13(1), 1-10.

Oliván Blázquez, B., Masluk, B., Gascon, S., Fueyo Díaz, R., Aguilar-Latorre, A., Artola Magallón, I., & Magallón Botaya, R. (2019). The use of flipped classroom as an active learning approach improves academic performance in social work: A randomized trial in a university. *PloS One*, 14(4), e0214623. doi: 10.1371/journal.pone.0214623.

Pediatric Nursing Staff. (2020). *Pediatric nursing procedures book***.** (5 th ed.). Egyptian Book Press.

Raghunath, G., Francis, Y. M., Karthikeyan, G., Sankaran, P. K., & Begum, Z. (2020). A study on the effectiveness of Peyton's four-step approach in teaching procedural skill for MBBS students. *Drug Invention Today*, 14(7), 1226-8.

Rehna, T., & Abraham, R. J. (2019). Effectiveness of case scenario-based learning over didactic lectures on teaching

pediatric infectious diseases to undergraduate medical students. *International Journal of Contemporary Pediatrics*, 6(5), 2137-42. doi:10.18203/2349-3291.ijcp20193740

Romero, M. D. C., Cazorla, M., & Buzón García, O. (2017). Meaningful learning using concept maps as a learning strategy. *Journal of Technology and Science Education,* 7(3), 313-32. doi:http://dx.doi.org/10.3926/jotse.276.

Schröder, H., Henke, A., Stieger, L., Beckers, S., Biermann, H., Rossaint, R., & Sopka, S. (2017). Influence of learning styles on the practical performance after the four-step basic life support training approach–An observational cohort study. *PloS One*, 12(5), https://doi.org/10.1371/journal.pone.0178210

Sebaee, H. A. A., Aziz, E. A. A., & Aziz, N. T. (2017). Relationship between nursing students' clinical placement satisfaction, academic self-efficacy and achievement. *IOSR Journal of Nursing and Health Science,* 6(02), 101-12.

Tan, C., Yue, W. G., & Fu, Y. (2017). Effectiveness of flipped classrooms in nursing education: systematic review and meta-analysis. *Chinese Nursing Research*, 4(4), 192-200.

Waltz, C. F., Jenkins, L. S., & Han, N. (2014). The use and effectiveness of active learning methods in nursing and health professions education: A literature review. *Nursing Education Perspectives*, 35(6), 392-400.

Xu, J. H. (2016). Toolbox of teaching strategies in nurse education. *Chinese Nursing Research*, 3(2), 54-7.

Yap, R., Moreira, A., Wilkins, S., Reeves, F., Levinson, M., & McMurrick, P. (2016). Suturing in small group teaching settings: A modification to peyton's four-step approach. *Medical Science Educator*, 26(4), 575-80.

Yilmaz, D. U., Palandoken, E. A., Ceylan, B., & Akbiyik, A. (2020). The effectiveness of scenario-based learning to develop patient safety behavior in first year nursing students. *International Journal of Nursing Education Scholarship*, 17(1).https://doi.org/10.1515/ijnes-2020-0011.

Zadeh, N. R., Gandomani, H. S., Delaram, M., & Yekta, Z. P. (2015). Comparing the effect of concept mapping and conventional methods on nursing students' practical skill score. *Nursing and Midwifery Studies*, 4(3).e27471.doi:10.17795/nmsjournal27471.